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(54) **SOCKET PROTECTION DEVICE AND CIRCUIT BOARD ASSEMBLY**

(75) Inventors: **Hai-Qing Zhou**, Shenzhen (CN); **Yi-Xin Tu**, Shenzhen (CN)

(73) Assignees: **Hong Fu Jin Precision Industry (ShenZhen) Co., Ltd.**, Shenzhen (CN); **Hon Hai Precision Industry Co., Ltd.**, New Taipei (TW)

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H01R 12/00 (2006.01)

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USPC **439/73**; 439/331

(58) **Field of Classification Search**
USPC 439/73, 331
See application file for complete search history.

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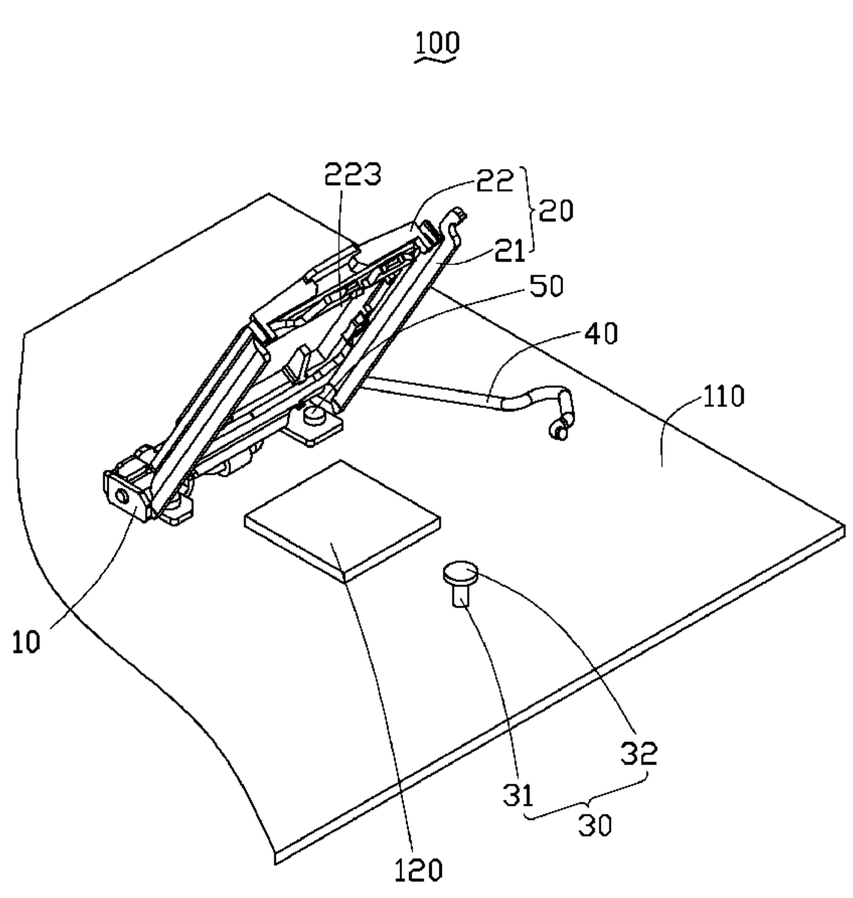
Primary Examiner — Ross Gushi
(74) *Attorney, Agent, or Firm* — Altis Law Group, Inc.

(57) **ABSTRACT**

A socket protection device includes a fixing member, a cover, a limiting member, and an operation member. The fixing member is secured to a circuit board. The fixing member includes a pair of first connecting blocks. The cover includes a second connecting block, a first latching portion, and a second latching portion. The limiting member is secured to the circuit board. The operation member includes a shaft and an operation rod secured to the shaft. The shaft rotatably connects the cover to the fixing member via the first and second connecting blocks. When the operation rod is pressed to drive the shaft to rotate, the cover is rotated toward the socket. When the cover covers the socket, the first latching portion latches the limiting member, and the second latching portion latches the operation rod.

16 Claims, 3 Drawing Sheets



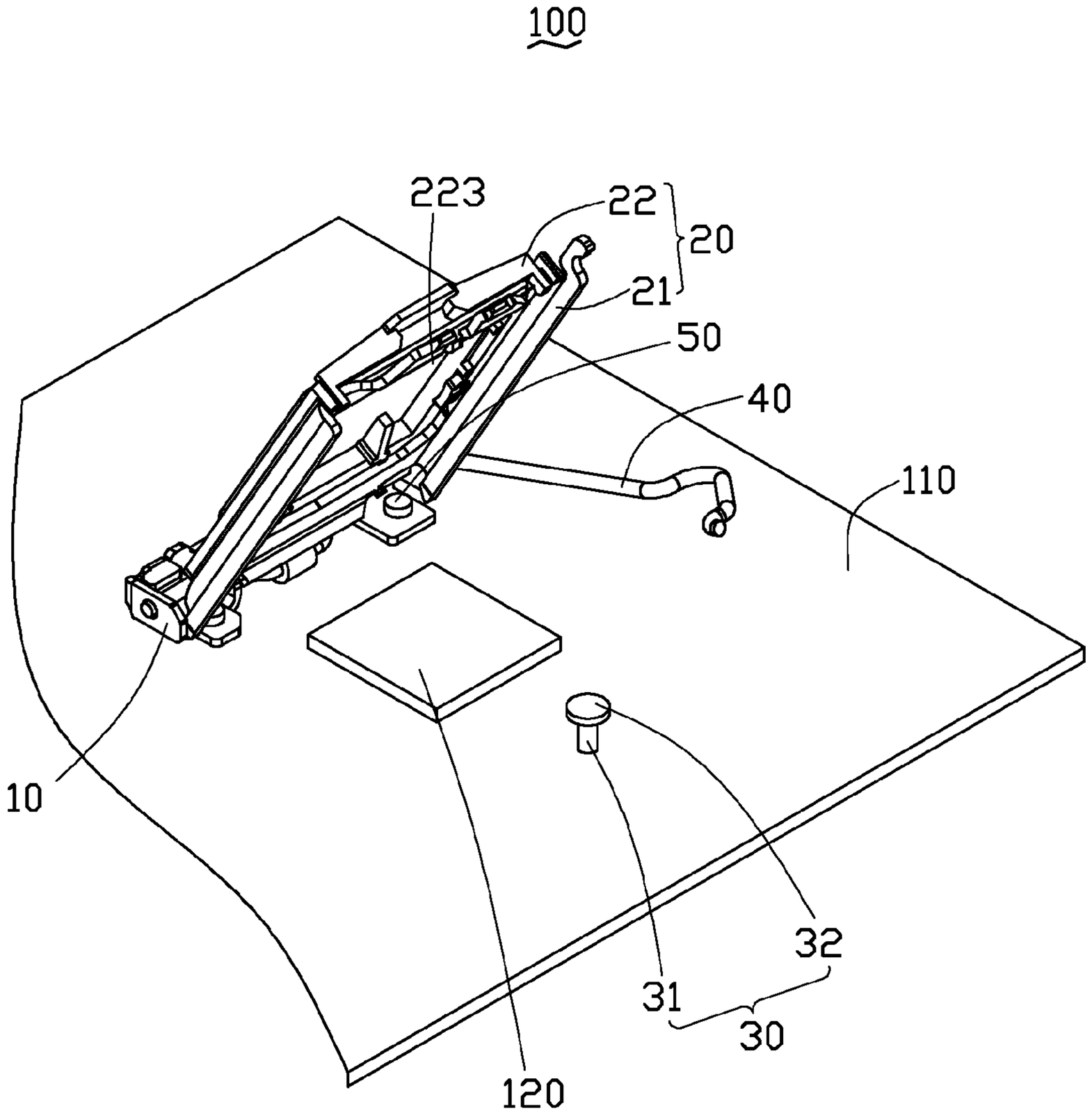


FIG. 1

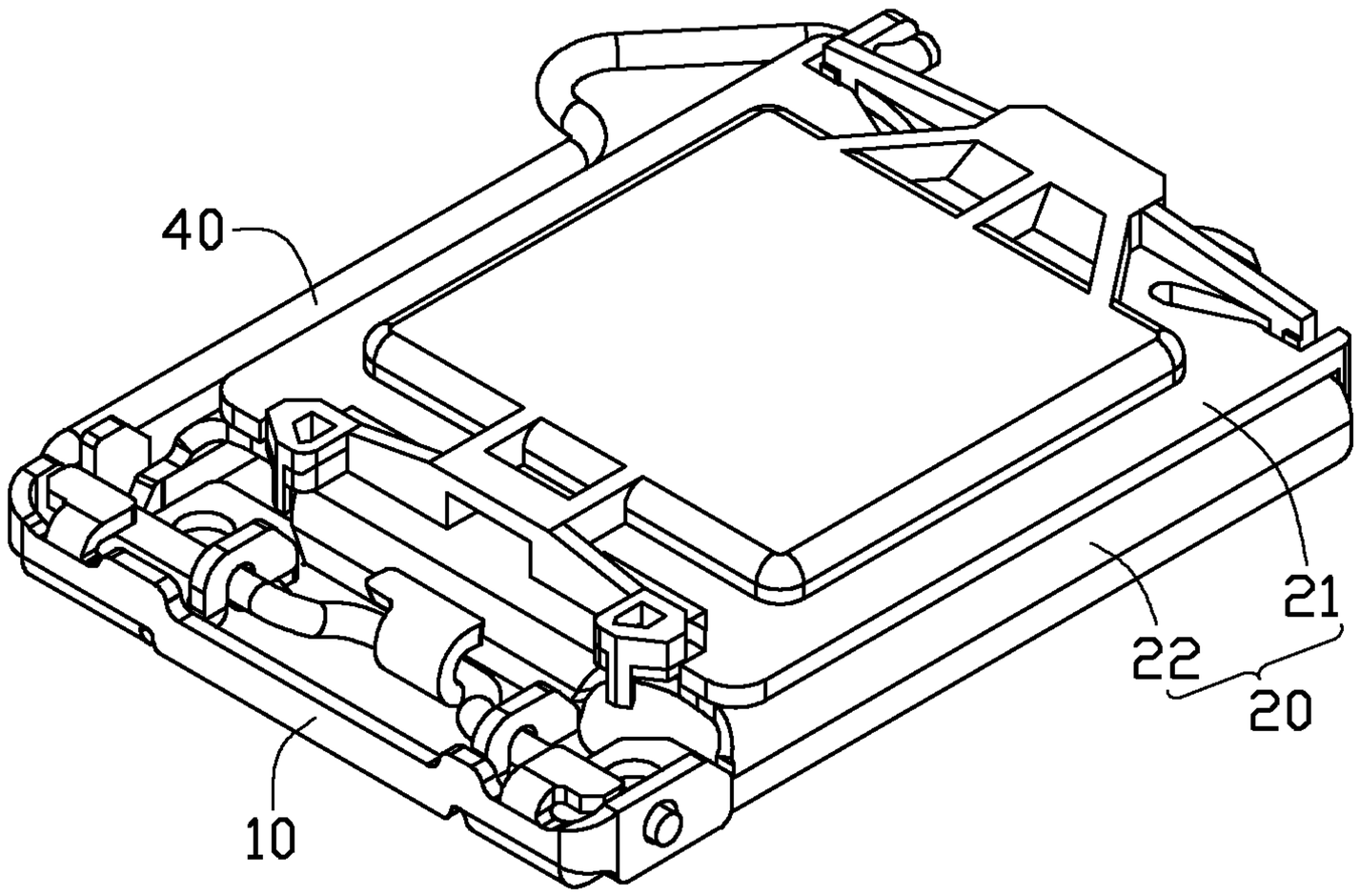
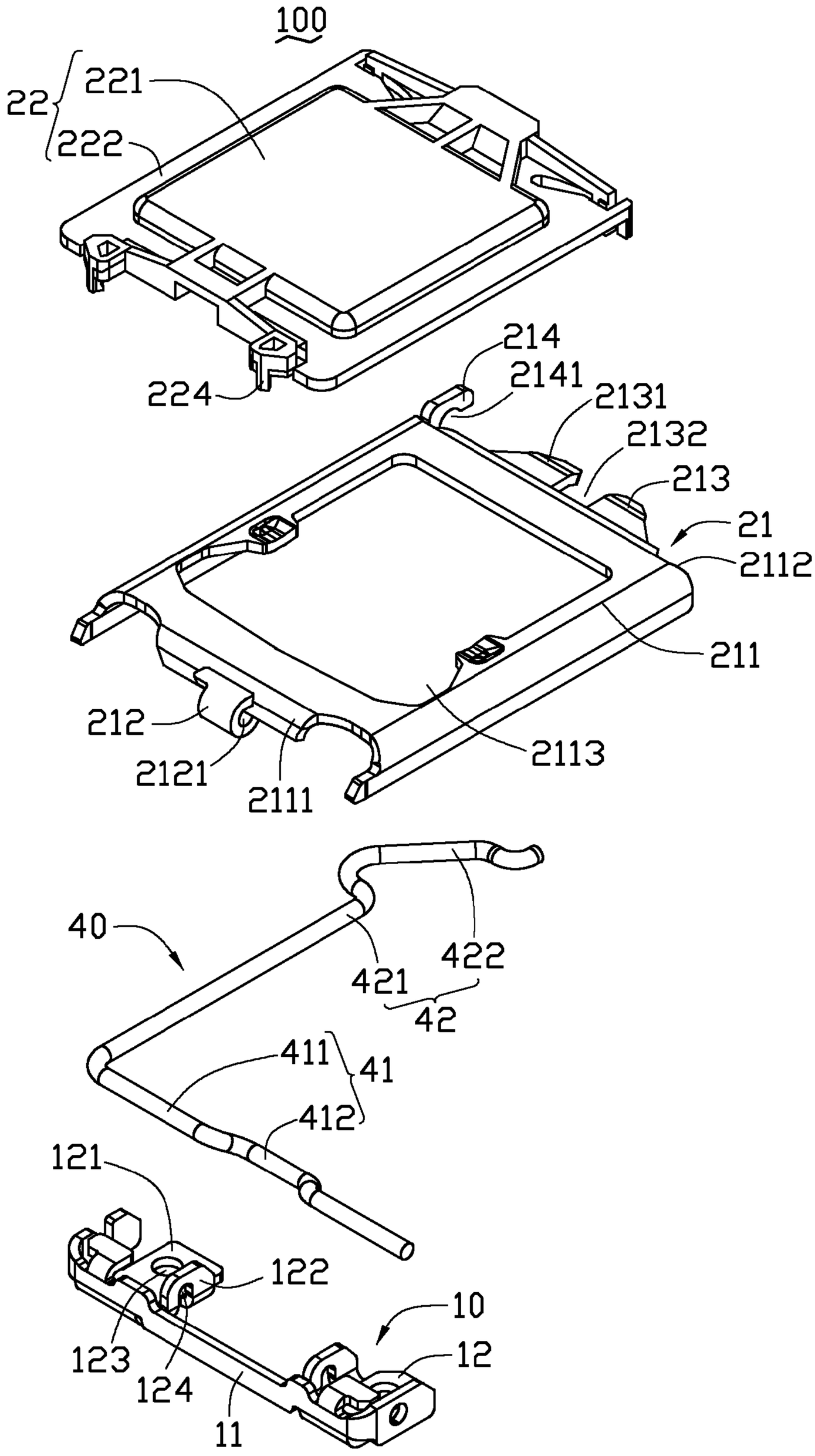


FIG. 2


100
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221
222
224
214
2141
2131
2132
213
21
2112
211
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2121
2111
2113
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421
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411
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412
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122
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12
123
124
11

FIG. 3

SOCKET PROTECTION DEVICE AND CIRCUIT BOARD ASSEMBLY

BACKGROUND

1. Technical Field

The present disclosure relates to socket protection devices and, particularly, to a socket protection device for preventing pins of a socket from being bent and a circuit board assembly using the socket protection device.

2. Description of Related Art

Typically, a central processing unit (CPU) socket includes a number of pins to electrically connect the CPU socket to a CPU inserted thereon. During testing the CPU socket, the CPU socket needs to undergo test from several workstations. As the pins of the CPU socket are exposed outside, the pins are likely to bend when the CPU socket is transferred from one workstation to the next workstation. Therefore, it would be desired to provide a protection device for protecting pins of CPU sockets.

BRIEF DESCRIPTION OF THE DRAWINGS

The components of the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Moreover, in the drawings, like reference numerals designate corresponding parts throughout several views.

FIG. **1** is an isometric view showing a socket protection device mounted on a circuit board, in accordance with an exemplary embodiment.

FIG. **2** is an isometric view of the socket protection device of FIG. **1**.

FIG. **3** is an exploded, perspective view of the socket of FIG. **1**.

DETAILED DESCRIPTION

Referring to FIGS. **1-3**, an embodiment of a socket protection device **100** is illustrated. The device **100** is to protect a socket **120** mounted on a circuit board **110**. In the embodiment, the socket **120** is a CPU socket including a number of metal pins (not shown). The device **100** includes a fixing member **10**, a cover **20**, a limiting member **30**, an operation member **40**, and a number of screws **50**. The circuit board **110** defines a number of through holes (not shown) for fixing the limiting member **30** and the screws **50**.

The fixing member **10** includes a fixing plate **11** and two bases **12** secured to the fixing plate **11**. Each base **12** includes a positioning block **121** and a connecting block **122** perpendicular to the positioning block **121**. Each positioning block **121** extends toward a direction perpendicular to an extension direction of the fixing plate **11**. Each positioning block **121** defines a fixing hole **123** cooperating with one through hole of the circuit board **110** to receive one screw **50**. The connecting blocks **122** are arranged between the positioning blocks **121**. Each connecting block **122** defines a shaft hole **124**. The shaft holes **124** are coaxial to each other, and the axes of the shaft holes **124** are parallel to the extension direction of the fixing plate **11**.

The cover **20** includes a first cover **21** and a second cover **22** detachably latched to the first cover **21**. The first cover **21** is made of metal. The first cover **21** includes a main body **211**, at least one connecting block **212**, a first latching portion **213**, and a second latching portion **214**. The main body **211** includes a front end **2111** and a back end **2112** opposite to the front end **2111**. The main body **211** defines a receiving space **2113** extending through thereto. The connecting block **212** is substantially arranged at the center of the front end **2111**. The connecting block **212** defines a shaft hole **2121**. The latching portions **213**, **214** are arranged on the back end **2112**. The latching portion **213** includes two latching blocks **2131**. The latching blocks **2131** are spaced from each other to form a latching slot **2132**. The latching portion **214** is arranged at a corner of the main body **211**. An end of the latching portion **214** adjacent to the main body **211** is bent to form a latching slot **2141** opposite to the second cover **22**.

The second cover **22** is made of plastic. The second cover **22** includes a protection portion **221** and a flange **222** surrounding the protection portion **221**. The protection portion **221** protrudes toward a direction opposite to the first cover **21** to form a recess **223** (see FIG. **1**). The shape and size of the recess **223** are substantially the same as the receiving space **2113**. A number of latching blocks **224** protrudes from the flange **222** to latch the second cover **22** to the first cover **21**.

The limiting member **30** is secured to the circuit board **110**. The limiting member **30** includes a first rod **31** secured to the circuit board **110** and a second rod **32** secured to the first rod **31**. The diameter of the first rod **31** is less than that of the second rod **32**. The width of the latching slot **2132** is greater than the diameter of the first rod **31** and less than the diameter of the second rod **32**.

The operation member **40** is made of metal. The operation member **40** includes a shaft **41** and an operation rod **42** substantially perpendicular to an end of the shaft **41**. The shaft **41** includes two first shaft portions **411** and a second shaft portion **412** arranged between the two first shaft portions **411**. The two first shaft portions **411** are arranged in a first straight line, and the second shaft portion **412** is in a second straight line parallel to the first straight line. The extension direction of the second shaft portion **412** is parallel to the extension direction of the two first shaft portions **411**. The operation rod **42** includes a connecting portion **421** secured to an end of one first shaft portion **421** away from the second shaft portion **412**, and a free portion **422** secured to the connecting portion **421**. The two first shaft portions **411**, the second shaft portion **412**, the connecting portion **421**, and the free portion **422** are substantially coplanar with each other. The second shaft portion **412** is nearer to the free portion **422** than the first shaft portions **411**.

In assembly, the screws **50** pass through the fixing holes **123** of the positioning blocks **121** and the through holes of the circuit board **110**, to secure the fixing member **10** to the circuit board **110** adjacent to a sidewall of the socket **120**. The limiting member **30** is secured to the circuit board **110** and adjacent to an opposite sidewall of the socket **120**. The shaft **41** passes through one shaft hole **124**, the shaft hole **2121**, and the other shaft hole **124** in sequence to cause the first cover **21** to be rotatably connected to the fixing member **10**. At this point, the second cover **22** is placed on the first cover **21**, and the latching blocks **224** cooperate with the flange of the first cover **21** to detachably latch the second cover **22** to the first cover **21**.

In use, the operation rod **42** is pressed to drive the shaft **41** to rotate, and the rotation of the shaft **41** drives the cover **20** to rotate toward the socket **120** until the cover **20** covers the socket **120**. During the cover **20** is rotated toward the socket **120**, the latching slot **2132** gradually approaches the limiting member **30**. The width of the latching slot **2132** is greater than the diameter of the first rod **31** and less than the diameter of the second rod **32**, thus when the cover **20** covers the socket **120**, the latching slot **2132** engages the first rod **31**, and the vertical movement of the cover **20** is limited by the second rod **32** to fix the cover **20**. Furthermore, when the cover **20** covers

the socket **120**, the latching slot **2141** latches the free portion **422** of the operation rod **42** to fix the operation member **40**. Thus, the device **100** can prevent the pins of the socket **120** from being bent when the socket **120** is transferred from one workstation to the next workstation.

If a CPU is needed to test the socket **120**, the cover **20** is operated to move opposite to the socket **120** until there is enough space for an operator to insert the CPU onto the socket **120**. When the CPU is inserted onto the socket **120**, the operation rod **42** is pressed to drive the cover **20** to rotate toward the socket **120** until the second cover **22** is resisted by the CPU. As the second cover **22** is detachably latched to the first cover **21**, the second cover **22** can be resisted by the CPU to disengage from the first cover **21**. At this point, the CPU is exposed outside via the receiving space **2113**, and the socket **120** can be tested. After the test has been finished, the CPU is pulled out of the socket **120**. The second cover **22** is then latched to the first cover **21** to protect the socket **120**.

Although the present disclosure has been specifically described on the basis of the exemplary embodiment thereof, the disclosure is not to be construed as being limited thereto. Various changes or modifications may be made to the embodiment without departing from the scope and spirit of the disclosure.

What is claimed is:

1. A socket protection device comprising:

a fixing member to be secured to a circuit board and adjacent to a sidewall of a socket on the circuit board, the fixing member comprising a pair of first connecting blocks parallel to each other, each of the first connecting blocks defining a first shaft hole;

a cover comprising a first cover rotatably connected to the fixing member, a second cover detachably latched to the first cover, a second connecting block defining a second shaft hole, and a first latching portion and a second latching portion which are arranged opposite to the second connecting block;

a limiting member to be secured to the circuit board and opposite to the fixing member across of the socket; and

an operation member comprising a shaft and an operation rod perpendicular secured to the shaft, the shaft passing through one of the first shaft holes, the second shaft hole, and the other one of the first shaft holes in sequence to rotatably connect the cover to the fixing member;

wherein, when the operation rod is pressed to drive the shaft to rotate, the cover is rotated toward the socket by the rotation of the shaft, when the cover covers the socket, the first latching portion latches the limiting member, and the second latching portion latches the operation rod.

2. The socket protection device as described in claim **1**, wherein the first cover defines a receiving space extending through the first cover, the first receiving space is to expose the socket when the first cover covers the socket.

3. The socket protection device as described in claim **2**, wherein the second cover comprises a protection portion and a flange surrounding the protection portion, the protection portion protrudes toward a direction opposite to the first cover to form a recess, the shape of the recess is substantially the same as that of the receiving space.

4. The socket protection device as described in claim **3**, wherein the shaft comprises two first shaft portions and a second shaft portion arranged between the first shaft portions, the first shaft portions are in a first straight line, and the second shaft portion is in a second straight line parallel to the first straight line.

5. The socket protection device as described in claim **4**, wherein the operation rod comprises a connecting portion and a free portion, the connecting portion is secured to an end of one of the first shaft portions away from the second shaft portion, the first shaft portions, the second shaft portion, the connecting portion, and the free portion are coplanar with each other, the second shaft portion is nearer to free portion than the first shaft portions, the free portion is latched by the second latching portion when the cover covers the socket.

6. The socket protection device as described in claim **1**, wherein the limiting member comprises a first rod secured to the circuit board and a second rod secured to the first rod, the diameter of the first rod is less than that of the second rod.

7. The socket protection device as described in claim **6**, wherein the first latching portion defines a latching slot, the width of the latching slot is greater than the diameter of the first rod but less than the diameter of the second rod.

8. The socket protection device as described in claim **7**, wherein the first latching portion comprises two latching blocks, the latching blocks are spaced from each other to form the latching slot.

9. A circuit board assembly comprising:

a circuit board;

a socket mounted on the circuit board;

a fixing member to be secured to the circuit board and adjacent to a sidewall of the socket, the fixing member comprising a pair of first connecting blocks parallel to each other, each of the first connecting blocks defining a first shaft hole;

a cover comprising a first cover rotatably connected to the fixing member, a second cover detachably latched to the first cover, a second connecting block defining a second shaft hole, and a first latching portion and a second latching portion which are arranged opposite to the second connecting block;

a limiting member to be mounted on the circuit board and opposite to the fixing member across the socket; and

an operation member comprising a shaft and an operation rod perpendicular secured to the shaft, the shaft passing through one of the first shaft holes, the second shaft hole, and the other one of the first shaft holes in sequence to rotatably connect the cover to the fixing member;

wherein, when the operation rod is pressed to drive the shaft to rotate, the cover is rotated toward the socket by the rotation of the shaft, when the cover covers the socket, the first latching portion latches the limiting member, and the second latching portion latches the operation rod.

10. The circuit board assembly as described in claim **9**, wherein the first cover defines a receiving space extending through the first cover, the first receiving space is to expose the socket when the first cover covers the socket.

11. The circuit board assembly as described in claim **10**, wherein the second cover comprises a protection portion and a flange surrounding the protection portion, the protection portion protrudes toward a direction opposite to the first cover to form a recess, the shape of the recess is substantially the same as that of the receiving space.

12. The circuit board assembly as described in claim **11**, wherein the shaft comprises two first shaft portions and a second shaft portion arranged between the first shaft portions, the first shaft portions are in a first straight line, and the second shaft portion is in a second straight line parallel to the first straight line.

13. The circuit board assembly as described in claim **12**, wherein the operation rod comprises a connecting portion and a free portion, the connecting portion is secured to an end of

one of the first shaft portions away from the second shaft portion, the first shaft portions, the second shaft portion, the connecting portion, and the free portion are coplanar with each other, the second shaft portion is nearer to free portion than the first shaft portions, the free portion is latched by the second latching portion when the cover covers the socket.

14. The circuit board assembly as described in claim **9**, wherein the limiting member comprises a first rod secured to the circuit board and a second rod secured to the first rod, the diameter of the first rod is less than that of the second rod.

15. The circuit board assembly as described in claim **14**, wherein the first latching portion defines a latching slot, the width of the latching slot is greater than the diameter of the first rod but less than the diameter of the second rod.

16. The circuit board assembly as described in claim **15**, wherein the first latching portion comprises two latching blocks, the latching blocks are spaced from each other to form the latching slot.

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